ABSTRACT (248/250)

Background: Active strategies such as myofunctional therapy (MFT) are increasingly proposed as important components in pediatric obstructive sleep disordered breathing (OSDB) management.

Objectives: To meta-analyze the impact of active strategies on objective sleep outcomes. The primary outcome was the apnea-hypopnea index (AHI). Secondary outcomes were average and nadir SpO_2.

Methods: This review followed the PRISMA guidelines and was registered on PROSPERO (CRD42024614732). Literature searches were conducted on PubMed, Scopus, Embase, and PEDro up to January 6, 2026. Eligibility was restricted to studies examining active strategies as isolated interventions in pediatric OSDB. Risk of bias was assessed using RoB 2.0 tool and ROBINS-I V2. Effect sizes were expressed as mean difference (MD) with 95% confidence intervals (CI) for randomized controlled trials (RCTs) and as mean change (MC) with 95% CI for non-randomized studies (nRCTs).

Results: Eight articles investigating MFT (n=7) and exercise (n=1) were included, most of which had serious risks of bias. Studies predominantly included children with persistent OSDB post-surgery. Regarding RCTs, no statistically significant change was observed for MFT on AHI (4 studies, n=174, MD: -1.68 (-3.61; 0.24), p=0.07) or average SpO_2 (2 studies, n=108, MD: 0.38 (-6.67; 7.43), p=0.62). Only one RCT reported SpO_2 nadir. Among nRCTs, no significant change was found for MFT on AHI (3 studies, n= 38, MC: -0.81 (-3.28; 1.67), p=0.30) or SpO_2 nadir (2 studies, n=29, MC: 1.04 (-0.62; 2.71), p=0.08). Only one nRCT reported average SpO_2.

Conclusion: Currently, no evidence supports isolated, active strategies as first-line treatment for pediatric OSDB.

KEYWORDS

pediatrics, sleep apnea, sleep disordered breathing, rehabilitation, physical activity, myofunctional therapy

1. Introduction

Obstructive sleep disordered breathing (OSDB) ranges from primary snoring to obstructive sleep apnea (OSA)(1). Left untreated, OSDB puts children at risk of multi-systemic consequences such as cardiovascular (e.g., endothelial damage, elevated blood pressure)(2,3) and neurocognitive (e.g., acute and chronic brain tissue change, poorer academic performance)(4,5) impairments. These potential consequences highlight the need for timely and effective treatment. However, a one-size-fits-all approach is unlikely to be appropriate given the heterogeneity of pediatric OSDB and its underlying pathophysiological mechanisms. Anatomy-based phenotypes, largely derived from OSA research, further characterize pediatric OSDB. Type I is linked to adenotonsillar hypertrophy in nonobese children, type II is associated with obesity, and type III is related to craniofacial and neuromuscular disorders(6,7). Current treatment follows a stepwise approach aligned with the underlying pathophysiology, including weight loss, intranasal corticosteroids, and surgical management of hypertrophied lymphoid tissue (1). If these consecutive interventions do not allow complete resolution, orthodontic treatment, ventilation support, craniofacial surgery, or tracheostomy may be considered (1). However, adenotonsillectomy results in persistent OSA in 13 to 51% of children with type I OSDB and 39 to 66% of those with type II OSDB (8). One proposed explanation for this persistence is the presence of multisite airway obstruction (9). Interestingly, the persistence of parafunctional habits, such as mouth breathing, has been highlighted in a 2-year-follow up study following adenotonsillectomy (10). Therefore, additional active management strategies, such as myofunctional therapy (MFT) or physical exercise, have been investigated alongside the recommended treatment approach across several types of pediatric OSDB (11–13). Among these, MFT has even been mentioned in pediatric type I OSA management guidelines (14). Yet, the types of active strategies, their modalities, and their effects on pediatric OSDB remain unclear. Therefore, this study aimed to summarize and meta-analyze the effects of active

strategies on objective sleep outcomes in children with OSDB, regardless of the underlying OSDB type.

2. Methods

This systematic review and meta-analysis followed the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 checklist (15) (Appendix A). The protocol was prospectively registered on PROSPERO (CRD42024614732) on November 26, 2024. This study focused on active strategies in children aged 0 to 17 years with OSDB. Only active strategies were considered. In this review, active strategies were defined as conservative, non-pharmacological interventions aiming to improve health through therapies targeting body structures and functions and requiring conscious participation by the child. In contrast, passive interventions (e.g., oral appliances), which do not require active participation, were excluded.

2.1 Search strategy

The following databases were screened to identify eligible studies on March 12, 2025, with no time restriction: MEDLINE, Scopus, Embase, PEDro. The search has been updated on January 6, 2026. The PICOS (Population [P], Intervention [I], Comparison [C], Outcome [O], Study type [S]) framework (16) was used to formulate the research question: "In children with OSDB [P], regardless of their type, do active strategies [I], compared with usual care [C], have an impact on the apnea-hypopnea index (AHI) [primary O], average SpO_2 [secondary O], or SpO_2 nadir [secondary O] in randomized controlled trials (RCTs) and non-randomized studies (nRCTs), including retrospective analyses [S]?".

Search terms included were (child*) OR (infant*), ((((((obstructive sleep apnea) OR (sleep disorder breathing)) OR (sleep disordered breathing)) OR (snoring)) OR (upper airway resistance syndrome)) OR (obstructive hypoventilation)) OR (nocturnal hypoxemia), and ((physical AND (activity OR therapy)) OR (exercise)) OR ((stomatognathic OR speech OR myofunctional OR oropharyngeal OR oral OR facial OR orofacial OR tongue OR throat OR breathing OR respiratory OR expiratory OR inspiratory) AND (therapy OR strength OR

training OR reeducation OR rehabilitation OR exercise)). Full search strategies for each database are provided in Appendix B.

2.2 Eligibility criteria

Studies published in English or French and aligned with the predefined PICOS criteria were included. Grey literature, conference abstracts, animal studies, and any type of review articles were excluded. No restriction was applied to comparators. Only studies featuring at least pre- and post-intervention data on AHI were included. When the effect of the intervention could not be isolated, composite interventions (e.g., weight loss programs which include physical activity) were excluded. Studies were included only if the specific effect of the composite intervention could be assessed against a suitable comparator.

2.3 Study selection and data extraction

References retrieved from the databases were imported into EndNote 20.6 (The EndNote Team, Clarivate, Philadelphia, PA, USA) (17), where duplicates were identified and removed. The remaining records were uploaded on Rayyan (18) for title and abstract screening. Full texts of potentially relevant articles were subsequently retrieved and assessed for eligibility. Data extraction was then performed for all included studies. Each step of the study selection process was conducted independently by two investigators (P.C., J.P.). Disagreements were resolved through discussion. Any remaining discrepancies were settled by a third investigator (W.P.).

Two data extraction tables were used to retrieve information from included articles. The first table included study details (e.g., first author, year of publication, study design), sample characteristics (e.g., number of children, type of OSDB, age, sex, BMI), and sleep-related outcomes assessed. The second table focused on the characteristics of the active strategies, including their type, the presence of a teaching process, the repetitions range, frequency, and duration.

2.4 Risk of bias assessment

Included studies had their risk of bias assessed by two investigators (P.C., J.P.), with a third investigator (W.P.) being available to resolve disagreements. The risk of bias for RCTs was assessed using the August 2019 version of the Risk of Bias (RoB) 2.0 tool (19), while nRCTs were assessed using the November 2024, V2 version of the Risk Of Bias In Non-randomized Studies - of Interventions (ROBINS-I) tool (20). The RoB 2.0 tool includes five domains: randomization process, deviations from the intended interventions, missing data, measurement of the outcome, and selection of the reported result. Scoring of these domains then allows the designation of an overall judgement for a study, with either low, some, or high concerns regarding the risk of bias (19). The ROBINS-I V2 tool has seven domains. All domains of the RoB 2.0 tool are found in the ROBINS-I V2 tool except for the randomization process. The three remaining specific domains featured in the ROBINS-I V2 include the following items: confounding, classification of interventions, and selection of participants into the study or into the analysis (20). Age, sex, body mass index, and the presence of neuromuscular or craniofacial disorder were considered as relevant confounding factors for the ROBINS-I V2 analyses. For single-arm studies, questions regarding assignment to intervention or control group could not be applied and resulted in a "not applicable" answer.

2.5 Statistical analysis

A meta-analysis was performed regarding the main outcome and the secondary outcomes if at least two articles were retrieved (21). RStudio (R Core Team) (2025) (22) and packages "dplyr" (23) and "meta" (24) were used. Analyses were separated according to the study type (i.e., RCTs and nRCTs). The summary statistic was the mean difference (MD) using follow-up values for RCTs, and the mean pre-post change (MC) for nRCTs (25). When data reported in the retrieved articles were insufficient to compute the summary statistics or were expressed using measures other than the mean and standard deviation, corresponding authors were contacted to obtain additional information. When authors could not be reached, means and

standard deviations (SD) were estimated using previously published formulas (26). If the true SD of the change was unavailable, a conservative correlation coefficient of 0.5 was used to calculate SD of the change (27). To pool data from single-arm studies with other nRCTs featuring more than one arm, pre- and post- data from the active strategy arm or group were used for the meta-analyses. Data from RCTs with more than two arms were handled in accordance with Cochrane methodology, using either a combining or a splitting approach depending on the interventions involved (28). A random-effects model was used as we did not expect the effect size to be the same for all included studies, accounting for the potentially notable differences in study populations, in active strategies types, and in protocols (29). Both the DerSimonian-Laird and Hartung-Knapp approaches for random-effects were performed, and the more conservative result was reported as recommended elsewhere (30). The I^2 index was used to quantify heterogeneity among studies (31). The Cochrane Handbook for Systematic Reviews of Interventions provides a rough interpretation guide for I^2 statistic, with overlapping ranges of 0 to 40%, 30 to 60%, 50 to 90%, and 75 to 100% representing a negligible, moderate, substantial, and considerable heterogeneity (32). If I^2 was equal or greater to 50% in presence of a statistically significant overall effect, and if applicable, possible causes were explored through subgroup analyses (32). A leave-one-out sensitivity analysis was planned on meta-analyses with a statistically significant overall effect. Results with p values below 5% were considered statistically significant.

2.6 Protocol deviation

Some deviations from the published protocol (CRD42024614732) must be acknowledged. First, the summary statistic that was initially mentioned was the MD. As it was considered inappropriate for nRCTs due to their design, the MC was used. Second, the Hausman test was not considered appropriate, as it was not suited to the expected data structure nor recommended for model selection (33). A random-effects model was preferred given the expected data

structure, with fixed-effects analyses performed to confirm that this approach was the most conservative.

3. Results

3.1 Included articles

Eight articles were included (Figure 1). Among them, four studies were RCTs, and four were nRCTs. One three-arm RCT was included, and its two intervention arms were combined, as both could be considered MFT interventions. In two nRCTs, baseline results were reported for the entire cohort, whereas follow-up results were reported by subgroups rather than for the full sample (34,35). They were included with the assumption that the subgroups would not have differed at baseline, and only the results from the group receiving an intervention through an active strategy were included in the meta-analyses. One study was excluded due to concerns regarding duplicate participant data (36).

Table 1 summarizes the included studies and their characteristics, along with a description of the study populations. All included studies, except one that did not provide details (37), enrolled children with prior surgical management, predominantly adenotonsillectomy. This was either the case for the entire cohort (n=5 studies) (12,34,35,38,39) or for a subset of participants alongside children without prior adenotonsillectomy and/or maxillofacial surgery (n=2 studies) (13,40). Children were not explicitly categorized according to OSDB subtypes in any of the included studies. Moreover, attempts to infer OSDB types from the available inclusion and exclusion criteria proved problematic, as the reported characteristics were often insufficiently detailed and some children could not be clearly fitted within the type I to III classification. Accordingly, based on the information that could be retrieved from the studies, children were classified as follows: Type I: non-obese surgically naïve children with adenotonsillar hypertrophy and no craniofacial or neuromuscular disorder; Ex-type I: children meeting type I criteria but with residual OSDB post-AT; Type II: obese children without severe adenotonsillar hypertrophy and without craniofacial or neuromuscular disorder; Type III: children with craniofacial and/or neuromuscular disorders. Four studies analyzed ex-type I OSDB: 2 RCTs

(intervention arms n=35, comparative arms n=29) (38,39) and 2 nRCTs (n=20) (34,35). Children with ex-type I or OSA without adenotonsillar hypertrophy were associated in one RCT (intervention arm n=23, comparative arm n=48) (40). One nRCT focused on type II OSDB (n=21) (12) and one nRCT focused on type III (n=18) (13).

Among active strategies, MFT interventions and an exercise program were identified in seven and one studies, respectively. For MFT, the duration of interventions ranged from one week (13) to two years (34), and frequency ranged from 20 minutes daily (40) to three sessions of 45 minutes daily (13). The exercise program included high-intensity interval training and resistance training, three days per week for eight weeks (12) (Table 2). As the latter study by Longlalerng et al. was the only one featuring this type of active strategy, it could not be included in the meta-analyses. Adherence to active strategies was reported in four studies. Regarding MFT, 12.5% to 56.5 % of children did not comply with MFT (38,40). The compliance rate to the exercise training program was reported in only one study and was very high (99.5%) (12). Dropouts in prospective studies ranged from 0% for an intensive, one-week MFT training camp (13) to 57.4% for a daily MFT intervention during a year (40).

3.2 Methodological quality of the included references

An overall high risk of bias was found for included RCTs (Figure 2). Only the study by Ye et al. reported details on the randomization process. All four RCTs were at high risk of bias in the domain of deviations from intended interventions. This was based on the absence of participant blinding (e.g., sham intervention) in all studies, combined with either unreported balance of non-protocol interventions between groups or evidence of poor adherence. The absence of a pre-specified, registered protocol with details on data analysis planned caused some concerns regarding bias in selection of the reported results.

Regarding nRCTs, overall risk of bias ranged from serious to critical (Figure 3). Serious risks of bias mostly related to a lack of control of confounding factors. Bias in selection of the

reported results was considered moderate for all nRCTs, mostly due to the unavailability of pre-specified data analysis plans.

3.3 Meta-analyses: AHI

Regarding RCTs, four studies investigated the impact of myofunctional therapy, with only two studies including a control group with no concurrent intervention (37,39). The other two references either had a control group performing nasal irrigation (38) or received a 'passive' form of MFT (i.e., oral appliance) (40). No statistically significant effect was found on AHI, with a MD of -1.68 events per hour (4 studies, n=84 experimental and n=90 control subjects, p = 0.07). Moderate heterogeneity was found between the studies (Figure 4). The study of Ye et al. showed the largest MD and had the smallest weight in the analysis.

Regarding nRCTs, three studies investigated MFT through either a retrospective cohort analysis (35), a retrospective case-control study (34), or a single-arm pre-post design (13). One nRCT investigated an isolated physical exercise intervention (12). No statistically significant effect of MFT was observed on AHI (3 studies, n=38 subjects, p=0.30) and a considerable heterogeneity was found (Figure 5).

3.4 Meta-analysis: Nocturnal SpO_2

Regarding RCTs, no meta-analysis was performed on the nocturnal SpO_2 nadir as only one study reported this outcome (39). The latter showed an estimated MD (95% CI) of 1.53 (-1.0; 4.1) in favor of MFT. No statistically significant effect of MFT on the average SpO_2 was observed (2 studies, n=44 experimental and n=64 control subjects p = 0.62). The MD was 0.38, with moderate heterogeneity between studies (39,40) (Figure 6).

Regarding nRCTs, three studies reported the nocturnal SpO_2 nadir, with two studies investigating MFT through either a retrospective case-control study (34) or a pre-post single-arm study (13), and one study investigating the impact of exercise (12). No statistically significant effect of MFT was observed on SpO_2 nadir (2 studies, n=29, p = 0.08) (Figure 7).

Only one nRCT reported the average nocturnal SpO_2. The estimated MC (95% CI) was 0.71 (-0.1; 1.5) in favor of MFT (35). Negligible heterogeneity was found between studies regarding SpO_2 nadir.

4. Discussion

This meta-analysis assessed the impact of active strategies in children with OSDB. All included studies focused on MFT interventions, except one, which focused on physical exercise. Within the available literature, the majority of studies have focused on children with persistent OSDB following surgery. Neither RCTs nor nRCTs showed statistically significant effects of active strategies on AHI or nocturnal SpO_2 in children with OSDB. Given the minimal to absent impact of active strategies on pediatric OSDB, these approaches should not be considered as first-line treatment options for OSBD in children.

A prior meta-analysis of active and passive MFT in children with OSDB found a 43% reduction in AHI (41). In their study, Bandyopadhyay et al. reported subgroup results for active MFT, and a statistically significant change was observed on AHI with a mean (95% CI) decrease of 1.04 (-1.98, -0.09), p=0.03. In our study, a greater MD was observed (-1.68 events per hour) although we did not reach statistical significance (p=0.07) due to a larger 95% CI (-3.61; 0.24). The random-effects model used in the meta-analysis by Bandyopadhyay et al. was not specified. We hypothesize that the observed discrepancy may be related to the use of the DerSimonian-Laird approach, which is still commonly applied as the standard random-effects method (42), in contrast to the more conservative Hartung-Knapp approach used in our study. The DerSimonian-Laird approach has been considered suboptimal in meta-analysis with a small number of studies (up to 20) and moderate to high heterogeneity, as it may incorrectly yield statistically significant results (42). Individually, all but one reference included in our study reported a reduction in AHI following MFT. However, when pooled and analyzed using a conservative approach, the evidence was insufficient to conclude a statistically significant effect of MFT on AHI. Notably, among the RCTs, only two studies directly compared MFT with a control group without any concurrent intervention. The remaining trials either compared

active MFT with passive MFT in the form of an oral appliance (40) or compared active MFT combined with nasal irrigation to nasal irrigation alone (38). As these comparators are already effective to some extent (40,43), they may have attenuated between-group differences. Indeed, a daily saline spray administered for six weeks has been shown to resolve OSDB symptoms in 41% of children (43). Moreover, passive MFT has demonstrated a greater reduction in AHI than active MFT, with mean (SD) changes of -3.28 (4.51) versus -0.29 (1.38), respectively ($p < 0.001$) (40).

As active interventions rely on patient involvement, motivation and adherence are key determinants of their effectiveness. Reported adherence to active strategies remains variable. In MFT, even the highest reported adherence rates still indicate that more than 10% of children were non-adherent (38). In contrast, adherence to an exercise training program was reported in the single study included and was unexpectedly high (99.5%). This result should be interpreted with caution since, in this study, children had the possibility to self-select their study group. Moreover, how adherence was reported is not clearly defined. A major future challenge will be to design active interventions that better promote adherence, for instance by incorporating motivational strategies such as gamification (44).

Children with type I OSDB were minimally represented or absent in included studies, as most participants were included post-adenotonsillectomy, although adenoid regrowth has been reported in 8% of children (45). Moreover, type II and/or type III OSDB were not consistently specified in the inclusion or exclusion criteria, leading to uncertainty regarding sample heterogeneity. Currently, it remains unclear which active intervention is most appropriate for each OSDB type. However, broader rehabilitation approaches that include active strategies (e.g., physical exercise) were previously mentioned in literature, such as weight loss programs

for children with type II OSDB. A meta-analysis performed by Roche et al. showed statistically significant, though clinically modest, improvement in AHI, with a MC (95% CI) of -0.51 (-0.94; -0.08), p=0.019. However, as in the meta-analysis by Bandyopadhyay et al., the random-effects model was not specified. Our meta-analysis did not include such composite interventions due to their multifaceted nature to ensure coherence and robustness of analyses specifically focused on active interventions strategies. To the best of our knowledge, physical exercise has never been evaluated as a standalone active intervention in children with type II OSDB using RCT design. Therefore, the independent effect of exercise on OSDB cannot be disentangled from the effect of composite, weight loss rehabilitation programs. In adults, several mechanisms potentially underlying exercise-related reductions in AHI have been proposed (46). Among the latter, changes in upper airway dilators' function and body composition were discussed by Mendelson et al. (46), although it remains unknown whether these mechanisms are applicable, even partially, to pediatric OSDB.

Our results might raise questions regarding the mention of MFT in French guidelines that propose a care pathway for pediatric type I OSDB (14). In these guidelines, MFT is mentioned as an option for mild-to-moderate OSA alongside other conservative approaches. This approach is also mentioned when surgery is indicated or if initial surgical treatment has failed. Although several individual RCTs reported significant reductions in AHI with MFT (37–39), the pooled estimates resulted in no significant benefits of MFT and substantial uncertainty with wide CIs. These wide CIs might indicate considerable variability in MFT efficacy depending on underlying OSBD phenotypes. Consequently, the available evidence is currently insufficient to recommend the use of MFT to improve objective sleep-related outcomes in pediatric OSDB. Future high-quality RCTs with careful phenotyping are warranted to identify whether there are

responders and their characteristics, and to demonstrate the real impact of MFT in specific pediatric OSDB populations.

This study presents several limitations. First, high heterogeneity was found regarding the protocols for the included RCTs. Heterogeneity arises from two main sources: variability in MFT protocols and heterogeneity in OSDB phenotypes. As previously highlighted (47), the variety found in control interventions requires caution in the interpretation of the results. One possible reason for such diversity is ethics committee regulations, only allowing a study to investigate a new intervention against standard of care. Indeed, MFT regimens are prone to differ according to clinical practice habits, as highlighted by the wide range of protocols retrieved. However, the transparency and methodological rigor of our analysis, such as the use of the most conservative model for data pooling, strengthens our results. Second, the results focused on objective sleep outcomes, mainly AHI. Future studies on active strategies should include children- or parents-reported outcomes measures, as AHI correlates poorly with outcomes such as quality of life (48). Only the RCT by Ye et al. reported pre- and post-MFT OSA-18 scores, showing a statistically significant improvement in quality of life following MFT ($p=0.014$), including reductions in physical symptoms such as mouth breathing, fewer upper respiratory tract infections, and decreased caregivers concerns (39). Third, analyses were based on a small number of studies, and statistically significant results should be interpreted with caution as the findings were not robust to the exclusion of individual studies.

5. Conclusion

Literature on active strategies in children with OSDB is scarce, particularly regarding physical exercise. Evidence for MFT is limited, with effects that are not statistically significant. Available evidence is insufficient to support isolated, active strategies as first-line therapeutic approaches for pediatric OSDB. Future research should prioritize rigorous phenotyping strategies and well-designed RCTs with appropriate control groups.

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7. Tables

Table 1: Summary of the studies included and their characteristics.

Table 1 legend: Results are presented as mean (SD), unless otherwise stated. RCT: Randomized controlled trial, nRCT: Non-randomized study, OSA: Obstructive sleep apnea, OSDB: Obstructive sleep-disordered breathing, AT: Adenotonsillectomy, MFT: Myofunctional therapy, BMI: Body mass index, PSG: Polysomnography, SD: Standard deviation, AHI: Apnea-hypopnea index, IQR: Interquartile range, NR: Not reported, NA: Not applicable, PG: Polygraphy, OSA-18: Obstructive sleep apnea-18 questionnaire, OMES: Orofacial myofunctional evaluation with scores, SRBD-PSQ: Sleep-related breathing disorder scale-pediatric sleep questionnaire.
[a]Type I: nonobese, surgically naïve children with adenotonsillar hypertrophy, and without craniofacial or neuromuscular disorder. Ex-type I: same as type I, but for children with residual OSDB post-AT. Type II: obese children with no severe adenotonsillar hypertrophy and no craniofacial or neuromuscular disorder. Type III: children with craniofacial and/or neuromuscular disorder. This classification was based on the inclusion and exclusion criteria of the included articles. When weight status was not mentioned among these criteria, statistical indicators of weight status describing the sample were used. When craniofacial or neuromuscular disorders were not mentioned, it was assumed that these populations were not represented in the sample.

Table 2: Characteristics of the active strategies interventions.

Table 2 legend: RCT: Randomized controlled study, nRCT: Non-randomized study, PSG: Polysomnography, HIIT: High intensity interval training, MFT: Myofunctional therapy, NR: Not reported, 1RM: One-repetition maximum.

8. Figures

Figure 1: Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) flow diagram.

Figure 2: Risk of bias for included randomized controlled studies, from the risk of Bias 2.0 tool.

Figure 2 legend: Risks for different items were represented in green, orange, and red for low concerns, some concerns, and high concerns, respectively.

Figure 3: Risk of bias for included non-randomized studies, from the ROBINS-I V2 tool.

Figure 3 legend: Risks for different items were represented in green, orange, red, and purple for low, moderate, serious and critical risk of bias, respectively. Grey dots represent areas where the ROBINS-I V2 was considered not applicable according to the study design.

Figure 4: Meta-analysis of randomized controlled trials regarding the influence of myofunctional therapy on the apnea-hypopnea index.

Figure 4 legend: The size of the squares represents the statistical weight for each study. SD: Standard deviation, MD: Mean difference, CI: confidence interval, HK: Hartung-Knapp method, AHI: Apnea-hypopnea index, CI: Confidence interval, MFT: Myofunctional therapy.

Figure 5: Meta-analysis of non-randomized studies regarding the influence of myofunctional therapy on the apnea-hypopnea index.

Figure 5 legend: The size of the squares represents the statistical weight for each study. AHI: Apnea-hypopnea index, HK: Hartung-Knapp method, CI: Confidence interval.

Figure 6: Meta-analysis of randomized controlled trials regarding the influence of myofunctional therapy on the average nocturnal SpO2.

Figure 6 legend: The size of the squares represents the statistical weight for each study. SD: Standard deviation, MD: Mean difference, CI: confidence interval, HK: Hartung-Knapp method, AHI: Apnea-hypopnea index, CI: Confidence interval, MFT: Myofunctional therapy.

Figure 7: Meta-analysis of non-randomized studies regarding the influence of myofunctional therapy on the SpO_2 nadir.

Figure 7 legend: The size of the squares represents the statistical weight for each study. HK: Hartung-Knapp method, CI: Confidence interval.